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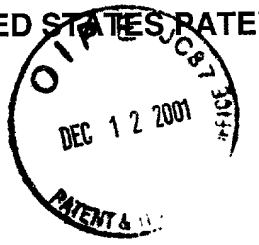
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re Patent Application of

Maertens et al.

Atty. Ref.: **2752-52**

Serial No. **09/899,303**

Group:

Filed: **July 6, 2001**

Examiner:

For: **PURIFIED HEPATITS C VIRUS ENVELOPE PROTEINS FOR DIAGNOSTIC AND THERAPEUTIC USE**

* * * * * * * * * * * *

December 12, 2001

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

AMENDMENT

Responsive to the Notice to File Corrected Application Papers dated October 30, 2001, entry and consideration of the following amendments and remarks are requested.

IN THE SPECIFICATION

Amend the specification as follows.

Page 36, amend the paragraph spanning lines 23-29 as follows:

Figure 21: Figures 21A-L provide nucleic acid sequences of the present invention. The nucleic acid sequences encoding an E1 or E2 protein according to the present invention may be translated (SEQ ID NO 3 to 13, 21-31, 35 and 41-49 are translated in a reading frame starting from residue number 1, SEQ ID NO:37-39 are translated in a reading frame starting from residue

number 2), into the amino acid sequences of the respective E1 or E2 proteins as shown in the sequence listing.

Page 38, amend the paragraph spanning lines 32-35 as follows:

Figures 35A-1 to 35A-8: Antibody levels to the different HCV antigens (Core 1, Core 2, E2HCVR, NS3) for NR and LTR followed during treatment and over a period of 6 to 12 months after treatment determined by means of the LIAscan method. The average values are indicated by the curves with the open squares.

Page 39, delete the paragraph spanning lines 1-4, and insert the following therefor:

-- Figures 35B-1 to 35B-8: Antibody levels to the different HCV antigens (NS4, NS5, E1 and E2) for NR and LTR followed during treatment and over a period of 6 to 12 months after treatment determined by means of the LIAscan method. The average values are indicated by the curve with the open squares.--

Page 39, amend the paragraph spanning lines 6-7 as follows:

Figures 36A and 36B: Average E1 antibody (E1Ab) and E2 antibody (E2Ab) levels in the LTR and NR groups.

Page 39, amend the paragraph spanning lines 8 and 9 as follows:

Figures 36A-D: Averages E1 antibody (E1Ab) levels for non-responders (NR) and long term responders (LTR) for type 1b and type 3a.

Insert the attached drawings for those which were originally filed.

IN THE CLAIMS

Amend the claims as follows.

Cancel claims 49-66, without prejudice.

Add the following claims.

--67. (new) A recombinant vector comprising a vector sequence, an appropriate prokaryotic, eukaryotic or viral promoter sequence followed by a nucleotide sequence allowing the expression of an HCV single or specifically oligomerized envelope viral protein selected from the group consisting of E1 and/or E2 and/or E1/E2 viral proteins.

68. (new) The recombinant vector according to claim 67, with said nucleotide sequence being characterised further in that it encodes a single HCV E1 protein starting in the region between amino acid positions 1 and 192 and ending in the region between amino acid positions 250 and 400, more particularly ending in the region between positions 250 and 341, even more preferably ending in the region between position 290 and 341.

69. (new) The recombinant vector according to claim 68, with said nucleotide sequence being characterised further in that it encodes a single HCV E1 protein starting in the region between amino acid positions 117 and 192 and ending in the region between amino acid positions 263 and 400, more particularly ending in the region between positions 290 and 326.

70. (new) The recombinant vector according to claim 68, with said nucleotide sequence being characterised further in that it encodes a single HCV E1 protein bearing a deletion of the first hydrophobic domain between positions 264 to 293, plus or minus 8 amino acids.

71. (new) The recombinant vector according to claim 67, with said nucleotide sequence being characterised further in that it encodes a single HCV E2 protein starting in the region between amino acid positions 290 and 406 and ending in the region between amino acid positions 600 and 820, more particularly starting in the region between positions 322 and 406, even more preferably starting in the region between position 347 and 406 and most preferably starting in the region between positions 364 and 406.

72. (new) The recombinant vector according to claim 71, with said nucleotide sequence being characterised further in that it ends at any of amino acid positions 623, 650, 661, 673, 710, 715, 720, 746 or 809.

73. (new) The recombinant vector according to claim 67, with said nucleotide sequence further comprising operably linked a 5'-terminal ATG codon and a 3'-terminal stop codon.

74. (new) The recombinant vector according to claim 67, with said nucleotide sequence being characterised further in that a factor Xa cleavage site and/or 3 to 10, preferably 6, histidine codons have been added 3'-terminally to the coding region.

75. (new) A recombinant vector comprising any of the sequences as represented in SEQ ID N0 3, 5, 7, 9, 11, 13, 21, 23, 25, 27, 29, 31, 35, 37, 39, 41, 43, 45, 47 and 49, or parts thereof.

76. (new) The recombinant vector according to claim 67, further characterised in that at least one of the glycosylation sites present in said E1 or E2 protein has been removed at the nucleic acid level.

77. (new) A vaccine composition comprising a recombinant vector according to claim 67.

78. (new) A method of vaccinating a human comprising administering a vaccine composition of claim 77.

79. (new) A composition comprising a recombinant vector according to claim 67.

80. (new) A host cell transformed with at least one recombinant vector according to claim 67, wherein said vector comprises a nucleotide sequence encoding HCV E1 and/or E2 and/or E1/E2 protein and a regulatory sequence operable in said host cell and capable of regulating expression of said HCV E1 and/or E2 and/or E1/E2 protein.

81. (new) A recombinant E1 and/or E2 and/or E1/E2 protein expressed by a host cell according to claim 80.

82. (new) A recombinant E1 and/or E2 and/or E1/E2 protein according to claim 81, further characterised in that said host cells are mammalian cells.

83. (new) A recombinant E1 and/or E2 and/or E1/E2 protein according to claim 81, further characterised in that said host cells are yeast cells.

84. (new) Method for purifying HCV envelope proteins selected from the group consisting of E1 and/or E2 and/or E1/E2, characterised as comprising at least the following steps:

-growing a host cell as defined in claim 80, transformed with said recombinant vector, in a suitable culture medium,

-expressing said vector sequence under suitable conditions, and,

-lysing said transformed host cells, preferably in the presence of an SH group blocking agent, such as N-ethylmaleimide (NEM),

-recovering said HCV envelope protein by affinity purification by means of for instance lectin-chromatography or immunoaffinity chromatography using anti-E1 and/or anti-E2 specific monoclonal antibodies, with said lectin being preferably lentil-lectin, followed by,

-incubation of the eluate of the previous step with a disulphide bond cleavage agent, such as DTT, preferably also in the presence of an SH group blocking agent, such as NEM or Biotin-NEM, and,

-isolating the HCV single or specifically oligomerised E1 and/or E2 and/or E1/E2 proteins by means of gelfiltration and possibly also by means of an additional Ni2+-IMAC chromatography and desalting step.

85. (new) A method for immunizing a human comprising administering a composition of claim 79.

86. (new) The composition according to claim 79, further comprising a pharmaceutically acceptable adjuvant.

87. (new) The recombinant vector according to claim 67, with said vector being characterized as a live recombinant vector.

88. (new) The recombinant vector according to claim 67, wherein said vector is a vaccinia virus vector.

89. (new) The recombinant vector according to claim 88, wherein said vector is avipox.

90. (new) The recombinant vector according to claim 88, wherein said vector is Ankara Modified Virus (AMV).

91. (new) The recombinant vector according to claim 67, wherein said vector is a baculovirus vector.

92. (new) A recombinant E1 and/or E2 and/or E1/E2 protein according to claim 81, further characterised in that said host cells are mammalian cells, infected with recombinant vaccinia virus.

93. (new) A recombinant E1 and/or E2 and/or E1/E2 protein according to claim 81, further characterised in that said host cells are bacterial cells.

94. (new) A recombinant E1 and/or E2 and/or E1/E2 protein according to claim 81, further characterised in that said host cells are fungal cells.--

REMARKS

Reconsideration is requested.

The specification has been amended to include the drawing sheets required by the Notice dated October 30, 2001 (copy attached). The claims have been amended, without prejudice, to advance prosecution.

An early and favorable Action on the merits is requested.

Respectfully submitted,

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MARKED UP SPECIFICATION

Page 36, amend the paragraph spanning lines 23-29 as follows:

Figure 21: [Nucleic acid sequences] Figures 21A-L provide nucleic acid sequences of the present invention. The nucleic acid sequences encoding an E1 or E2 protein according to the present invention may be translated (SEQ ID NO 3 to 13, 21-31, 35 and 41-49 are translated in a reading frame starting from residue number 1, SEQ ID NO:37-39 are translated in a reading frame starting from residue number 2), into the amino acid sequences of the respective E1 or E2 proteins as shown in the sequence listing.

Page 38, amend the paragraph spanning lines 32-35 as follows:

[Figure 35A] Figures 35A-1 to 35A-8: Antibody levels to the different HCV antigens (Core 1, Core 2, E2HCVR, NS3) for NR and LTR followed during treatment and over a period of 6 to 12 months after treatment determined by means of the LIAscan method. The average values are indicated by the curves with the open squares.

Page 39, delete the paragraph spanning lines 1-4, and insert the following therefor:

--[Figure 35B] Figures 35B-1 to 35B-8: Antibody levels to the different HCV antigens (NS4, NS5, E1 and E2) for NR and LTR followed during treatment and over a period of 6 to 12 months after treatment determined by means of the LIAscan method. The [avergae]

average [vallues] values are indicated by the curve with the open squares.--

Page 39, amend the paragraph spanning lines 6-7 as follows:

[Figure 36] Figures 36A and 36B: Average E1 antibody (E1Ab) and E2 antibody (E2Ab) levels in the LTR and NR groups.

Page 39, amend the paragraph spanning lines 8 and 9 as follows:

[Figure 37] Figures 36A-D: Averages E1 antibody (E1Ab) levels for non-responders (NR) and long term responders (LTR) for type 1b and type 3a.